8/3/01

EPA Region 7

Statement of Basis for the Abbott Laboratories Facility Wichita, Kansas EPA Identification # KSD981495567

I. INTRODUCTION

Abbott Laboratories (Abbott) operated a facility at 6765 South Ridge Road in Wichita, Kansas from 1960 to 1985.

In July of 1990, the U. S. Environmental Protection Agency Region 7 (EPA) and Abbott entered into a Resource Conservation and Recovery Act (RCRA) 3008 (h) Order (Order). The Order required Abbott to:

submit a plan for continuing operation of a groundwater extraction system that Abbott had installed in the 1970s;

conduct a facility investigation to determine the horizontal and vertical extent of contamination in soil, sediment, surface water, and groundwater, and;

prepare a study of potential cleanup activities should contaminants be discovered at levels of concern during the investigation.

This Statement of Basis describes the proposed corrective measure (hereinafter the proposed remedy) for the Abbott facility in Wichita, Kansas. This document serves as a companion document to the RCRA Facility Investigation Report (RFI), draft Corrective Measures Study Report (CMS), and other information as documented in the Administrative Record. For more detailed information, please see the Administrative Record at the locations listed at the end of this document.

Also, this document:

- Identifies EPA's proposed remedy for addressing contaminated ground water due to past facility operating practice and the reasons for the proposal;

- Summarizes the past operational history and current conditions of the facility;
- Describes other remedies that were considered, and;
- Provides information on how the public can be involved in the remedy selection process; and
- solicit public review of, and comment on all alternatives, including any not previously studied.

EPA is providing this document as part of EPA's public involvement regulatory requirements under the Resource Conservation and Recovery Act (RCRA).

EPA will approve a remedy for Abbott only after the public comment period has ended, all comments have been reviewed, and responses have been prepared to address the public's comments. EPA may modify the proposed remedy or select another remedy, based on new information or comments received from the public during the public comment period. A public hearing has not been scheduled, but one will be offered if sufficient public interest exists.

II. PROPOSED REMEDY

The proposed remedy for groundwater is monitored natural attenuation. Over time, natural processes tend to remove contamination from groundwater. These processes include, dilution (fresh water mixing with contaminated water), adsorption (the tendency for contaminants to adhere permanently to soil particles), and biological degradation (some microbes actually use the contaminant as a food source). Groundwater quality will be monitored using a system of wells to assure that the one contaminant remaining in groundwater, that is attributable to Abbott's past operational history, does not migrate from its current, on-site location.
Although the CMS recommended no further action, EPA believes that there is enough uncertainty in the estimates of contaminant mass and the risk assessments that additional monitoring is warranted.

III. FACILITY BACKGROUND AND CURRENT CONDITIONS

Abbott began operations in Wichita Kansas in 1960. The original facility was constructed to produce cyclohexylamine which was a component used in the production of artificial sweetener. Later, the facility also produced amine-based intermediate products, which were used in making textiles, rubber, adhesives, and pharmaceuticals. The facility consisted of an operational area and waste handling, storage, and disposal areas.

Abbott sold the operational portion of the facility to Air Products and Chemicals Incorporated (Air Products) in July of 1985 but retained ownership of the following solid waste management units (SWMUs): Underground injection Control Well (UIC); evaporation pond; evaporation lagoon; and the former drum storage pad (see attached map). These four SWMUs are shown on the attached drawing and are described as follows:

Solid Waste Evaporation Pond

The solid waste evaporation pond was constructed in 1960 and was closed in 1981. The pond was constructed with a compacted clay liner in the bottom and sides. It was approximately one acre in area and was ringed by berm. This created a pond about 4 feet deep that held about 1.3 million gallons of liquid. The purpose of the pond was to collect process waste water and allow it to evaporate with no surface flow discharge. The process wastes constituents identified in the pond when it was closed consisted of acrylonitrile, benzene, and toluene. No records or employee interviews recalled any surface overflow of the pond. Closure was accomplished in 1981 by pushing in the berm and capping the entire area with an 18 inch thick clay cap. In 1983, an asphalt cap was added. Facility investigations and subsequent groundwater monitoring indicate that this is no longer an active source of contamination to groundwater. Closure of this pond was approved under the authority of the Kansas Department of Health and Environment (KDHE).

Solid Waste Evaporation Lagoon

The lagoon was constructed in 1980 and was closed in 1986. It was used to dispose of process wastewater by evaporation with zero discharge. The lagoon was constructed with a clay liner and included a leachate collection system which drained to a sump on the north side of the lagoon. No records or employee interviews recalled any surface overflow of the lagoon. Waste constituents identified in the lagoon at the time of closure consisted of amines, cyclohexylamine, dicyclohexylamine, acrylonitrile, benzene, and toluene. KDHE approved closure activities which consisted of pushing in the sides of the lagoon and capping it with a 2-foot thick clay seal followed by a soil cover. The leachate collection system, including a sump and sump pumps, were left in place to collect leachate resulting from infiltration and percolation. While the lagoon as a SWMU is technically closed, the non-RCRA hazardous leachate collected from the lagoon collection system is disposed of by injection into the Underground Injection Control Well. Disposal of this leachate is under the authority of the KDHE. Facility investigations and subsequent groundwater monitoring indicate that the lagoon, as closed, is no longer an active source of contamination to groundwater.

Underground Injection Control (UIC) Well

The well was constructed in 1981 to dispose of production waste water, leachate from the evaporation lagoon, and contaminated groundwater from an on-site groundwater extraction system. The well is permitted for subsurface injection of non-hazardous wastewater. The well injects into the Arbuckle Formation at depths between 3,978 and 4,646 feet below the ground surface.

Drum Storage Pad

The drum storage pad was constructed in 1974 and was closed in 1986. The concrete pad (70-foot by 65-foot) was surrounded by an earthen ditch and dike with a capacity for more than 2,000 55-gallon drums. The pad was used to store drummed wastes until they

could be recycled or transported to a permitted disposal facility. All drainage within the pad area led to a sump and pump collection system. Wastes stored at the pad included spent toluene, methanol solvent wastes, and ignitable corrosive wastes. Records from a KDHE inspection in 1982 documented some leaky drums. These were classified as small spills and were cleaned-up. There are no records indicating any major releases. The pad underwent a KDHE-approved closure, which was achieved by pushing the containment dike into the containment ditch and re-vegetating the disturbed area. This no longer believed to be an active source of contamination at the facility.

Groundwater contamination was discovered in 1977 and first studied in detail in 1979. Quarterly groundwater monitoring began in 1980. In 1981, Abbott implemented a program to extract contaminated groundwater and dispose of it in the UIC well. This system continues to operate today.

Results of the investigation, identified the following the constituents of concern related to Abbott's historical operations:

Acrylonitrile;
Aniline;
Pyridine; and
o-toluidine.

Based on soil borings and monitoring well information, EPA concludes that the groundwater contamination by Abbott's constituents was most likely due to releases from the solid waste evaporation pond during its operational period. There are additional contaminants in groundwater (primarily volatile organic constituents) not related to Abbott's operations that have been drawn into, and contained by, Abbott's groundwater extraction wells. Since these constituents are not permitted for disposal in the UIC well, granulated activated carbon filters are in place between the extraction wells and the UIC well. These filters effectively remove the volatile organic contamination. About twice a year, Air Products uses the UIC well on a temporary basis, for disposal of non-hazardous wastewater from its operations. This wastewater goes through particulate filters before it is injected because it contains sediments that might plug the UIC well.

The Corrective Measures Report was issued in June 2000. It evaluated three alternatives: (1) no further action; (2) groundwater extraction, treatment, and disposal and; (3) monitored natural attenuation.

IV. SUMMARY OF FACILITY RISKS

The facility investigation disclosed that groundwater had been contaminated from past facility releases. The Abbott contaminants that were originally detected are:

Acrylonitrile;
Aniline;
Pyridine; and
o-toluidine (2-methyl aniline).

Acrylonitrile and pyridine have not been detected since September 1990. Aniline has not been detected since January 1990. Based on the sampling conducted in March 2000, o-toluidine is the only RCRA, Abbott constituent of concern that is still detected in groundwater. As of March 2001, o-toluidine was found at 24.2 ug/L in a one time ground water sample from the northwest corner of the closed solid waste evaporation pond and has been consistently detected in permanent monitoring well 101I .

To pose any risk to human health or the environment, there must be an exposure pathway where the contamination can actually reach a receptor. Exposure pathways are considered complete if the following four elements are present: (1) a chemical release, (2) chemical movement in an environmental medium (air, soil, or water), (3) a receptor in contact with the medium, and (4) a route of exposure (eating, drinking, breathing, skin contact) for the receptor. Since groundwater does not discharge to any surface water at the facility, the only potential pathway for exposure at Abbott would be in an off-site private well that captured the plume. Then there could be exposure by dermal contact and inhalation (showering, bathing etc.) and ingestion (drinking, cooking etc.) and all four elements would be present. Currently, elements three and four are not present so , there are no complete exposure pathways.

Potential Carcinogenic Values

Potential carcinogens (cancer-causing chemicals) are classified in one of the following groups:

Group A - Human Carcinogen: sufficient evidence of carcinogenicity in humans;
Group B - Probable Human Carcinogen;
Group B 1 - limited evidence of carcinogenicity in humans;
Group B2 - sufficient evidence of carcinogenicity in animals, with inadequate evidence or lack of evidence in humans;
Group C - Possible Human Carcinogen: limited evidence of carcinogenicity in animals and inadequate evidence or lack of evidence in humans; and
Group D - Not Classifiable as to Human Carcinogenicity: inadequate or no evidence.
Group E - Evidence of Non-Carcinogenicity for Humans: adequate studies show no evidence of carcinogenicity.

Cancer-causing risks are mathematically estimated only for chemicals in groups A, B and C. Carcinogenic risks are estimated as the probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen. Cancer risks that are estimated to be equal to or less than one additional cancer case out of one million people ($1x10^{-6}$) are considered to be protective and are not generally addressed by cleanup work. Estimated risks that are greater than one excess cancer risk out of 10,000 people ($1x10^{-4}$) are usually treated by EPA as risks that require cleanup. O-toluidine is considered a class B2 carcinogen because in laboratory studies there have been confirmed cases of cancer in animals exposed to high doses of o-toluidine; however, the relevance of these studies to humans is unknown. EPA Region 3 has developed some screening levels for various chemicals at the $1x10^{-6}$ (most protective) level. This level for o-toluidine is 0.28 ug/L. O-toluidine was not detected in any wells between March of 1991 and March of 1998. In March 1998, the level in well MW 101 I, which is located between the southeast corner of the former drum storage area and the northeast corner of the closed

evaporation pond, was 25.2 ug/L and has since declined to 13.1 ug/L. In March 2001, Abbott collected additional groundwater samples with the highest level of o-toluidine (24.2ug/L) in a sample near the northwest corner of the closed evaporation pond which, assuming that someone was using the contaminated water, falls below the 10^{-6} risk range. The potential risk to any future industrial worker are 6.6×10^{-8} and so neither scenario has risk that triggers a cleanup activity. EPA is not suggesting additional engineered remedial activities but because of the uncertainties in the contaminant mass estimates and the use of a surrogate compound in the risk calculations, EPA believes additional monitoring of the gorundwater is warranted.

V. SCOPE OF CORRECTIVE ACTION

Abbott calculated the mass of o-toluidine remaining in the groundwater by using the most recent concentration (24.2 ug/L) , an estimated plume diameter, estimated plume thickness, and an estimated porosity of the aquifer. Based on this calculation, there appears to be one to two pounds of o-toluidine remaining in groundwater. In March 2001, Abbott undertook another investigation that consisted of collecting groundwater samples from the same depth as MW-101I at four locations surrounding MW-101I. The analytical results from these samples better define the plume limits. In addition, Abbott used EPA's BIOSCREEN Natural Attenuation Decision Support System model Version 1.3 to predict how far the plume would migrate before it reached a level less than 0.28 ug/L (the level below which there are no health concerns) if the plume was no longer contained by Abbott's groundwater extraction system. According to the model results for o-toluidine, it should be below levels of concern in the most contaminated area within five years. No o-toluidine has been detected in Abbott's extraction wells since September of 1986 which indicates that all reductions of the constituent since then have been due to natural processes (natural attenuation) rather than removal. EPA proposes to let natural attenuation continue as the method of contaminant destruction without continued groundwater extraction. To ensure that contamination behaves as the model predicted, Abbott will be required to continue monitoring groundwater in selected wells until o-toluidine remains below 0.28ug/L for three consecutive years . If during the monitoring period, contamination reaches the downgradient wells, Abbott will be required to amend the Corrective Measures Study and additional remedial actions will be evaluated.

VI. SUMMARY OF ALTERNATIVES CONSIDERED

The following is a summary of treatment technologies and process options that were evaluated. Details of the evaluations are contained in the draft CMS.

1. *No further action*
This alternative includes discontinuing operation of the existing groundwater extraction/UIC well injection system at the facility. In addition, the groundwater monitoring activities conducted at the facility since 1980 would be terminated. The existing equipment, including extraction wells and the UIC well, could be left in place at

the facility but would not be utilized for Abbott's RCRA compliance program. Under direction of KDHE, the UIC well would be utilized to support a separate KDHE-regulated closure activity. The potential for natural attenuation to degrade the remaining o-toluidine would continue with this alternative.

2. *Groundwater Extraction, Treatment, and Discharge*
This alternative includes the continued operation and maintenance of the existing groundwater pump and treat system. The existing extraction well system consists of two extraction wells, EW-10 and EW-17 which pumped initially at rates of approximately 40 gpm and 100 gpm, respectively. More recently, these wells have degraded and pumping rates have substantially declined. Groundwater is extracted from EW-10 and EW-17, pumped to a 5,000-gallon holding/equalization tank, and then fed by gravity to the UIC well. An in-line granular activated carbon (GAC) treatment system is located between EW-10 and the holding tank. The GAC treatment system reduces the concentrations of VOC's attributed to an off-site source to acceptable levels prior to disposal in the injection well.
The UIC well is composed of a 7.75-inch diameter outer casing cemented from the bottom to the surface and a 4.5-inch diameter inner injection string. The well injects into the Arbuckle Formation at depths between 3,978 and 4,646 feet below the ground surface. Wastewater injection is by gravity flow from a surface surge tank. The water level in the well is approximately 250 feet below ground surface.
The UIC well is regulated by the Kansas Underground Injection Control Program (Permit No. KS-01-173-001).

3. *Monitored Natural Attenuation*
This alternative includes discontinuing use of the existing extraction system but continues monitoring the groundwater. Natural processes tend to remove contamination from groundwater over time. These processes include dispersion, dilution, adsorption, and chemical and biological degradation. Evaluation of this remedy utilized the EPA BIOSCREEN Model to assess whether natural attenuation of o-toluidine would occur if the groundwater extraction system was turned off. The BIOSCREEN Model which is used to predict the degradation rate of contaminants, indicates that natural attenuation of the o-toluidine would occur and that levels of o-toluidine would be below the EPA Region 3 screening level before reaching any potential receptor. Alternative 3 includes groundwater monitoring in selected wells to ensure that the modeled predictions are correct and that unacceptable levels of o-toluidine do not reach receptors. This alternative will also include a contingency plan should the monitoring results show unexpected behavior of the contaminant plume.

VII. EVALUATIONS OF PROPOSED REMEDY AND ALTERNATIVES

EPA has evaluated each of the corrective measure alternatives presented above and proposes alternative 3 (monitored natural attenuation) for remediation of contaminated groundwater. In choosing the remedy, each alternative was evaluated against the following four general standards for remedies and five remedy selection factors.

STANDARDS FOR REMEDIES

1. Protection of Human Health and the Environment; All the alternatives reduce the risk to groundwater posed by contaminated groundwater and contaminated soil. Natural attenuation would proceed under Alternative 1; however, there would be no way to ensure that contamination did not migrate into off-site groundwater. Even though proper personal protective equipment would be used, alternatives 2 and 3 pose some risk to on-site monitoring workers and people involved in transportation, treatment, or disposal of potentially-contaminated residuals (spent carbon, purge water from sampling, etc.).

2. Attainment of Cleanup Standards: Based on the historical monitoring data, it appears that the groundwater extraction system has reached the limits of its ability to remove o-toluidine from groundwater. Thus the groundwater extraction system may not be able to attain the cleanup standard. Both alternatives 1 and 3 could meet cleanup standards.

3. Controlling Source(s) of Release: The sources of groundwater contamination (the Evaporation pond, Evaporation Lagoon, and the Former drum storage pad) have been closed and/or controlled under authority KDHE. The proposed remedies do not address source control.

4. Compliance with Waste Management Standards: Alternative 2 would continue to generate spent carbon. Although the contaminants that make filtering necessary are not due to Abbott's operations, it would not be possible to separate Abbott's constituent from other contaminants as groundwater is extracted. Alternatives 1 and 3 would not generate significant quantities of hazardous wastes

REMEDY SELECTION FACTORS

1. Long-Term Reliability and Effectiveness: Alternative 1 would provide long term reliability through natural attenuation. Alternative 2 would provide long-term reliability in containing the groundwater plume. Alternative 3 would provide long term assurance that concentration is being reduced and the plume doesn't migrate.

2. Reduction of Toxicity, Mobility or Volume of Contaminants: Alternative 2 would reduce the mobility of the plume but may not reduce the remaining volume of contaminant. Alternatives 1 and 3 would be effective for reducing toxicity and volume of contaminants. Alternative 2 would require shipment of potentially-contaminated carbon off-site for treatment and disposal. Alternative 1would not generate any residuals, and 3 would generate very minor residuals.

3. Short-Tem Effectiveness: All alternatives would provide immediate effectiveness.

4. Implementability: Alternative 2 is already in place. Alternative 1 could be implemented immediately, alternative 3 would require monitoring wells, most of which are in place, however there may be a need for a few more strategically located wells.

5. Cost

Alternative 1 (no further action) Virtually without cost.

Alternative 2 (continue groundwater extraction/ injection) is estimated to cost about $200,000/year.

Alternative 3 (monitored natural attenuation) is estimated to cost about $25,000/year.

The following tables provide a summary of how each remedy compares to the remedy standards and selection factors.

STANDARDS FOR REMEDY

Alternative	Protection of Human Health and the Environment	Attainment of Cleanup Standards	Controlling Sources of Releases	Compliance with Waste Management Standards	Total Score
1. No Further Action	2*	2*	N/A	3	7
2. Groundwater Extraction with Injection	3	1	N/A	2	6
3. Monitored Natural attenuation	3	3	N/A	3	9

* The EPA believes that this remedy would probably be protective of human health and the environment; however, this protection could not be confirmed without additional groundwater monitoring.

REMEDY SELECTION FACTORS

Alternative	Long Term Reliability	Reduction of Contaminants	Short term effectiveness	Implementability	Cost	Total Score
1. No Further Action	1	3	3	3	3	13
2. Groundwater Extraction with Injection	1	1	3	3	1	9
3. Monitored Natural attenuation	3	3	3	3	2	14

Based on this scoring, the EPA has selected monitored natural attenuation as the proposed remedy because of the uncertainty with the estimates of plume mass. If the biodegredation model is correct, the plume should attenuate to below levels of concern in a few years. On-going monitoring will test the modeling estimate.

The proposed remedy satisfies the following criteria:

Protective of human health and the environment;

Attains media cleanup standards; and

Complies with applicable standards for management of wastes.

VIII. Public Participation

EPA held a public availability information session at the Haysville Public Library on June 28 2001. EPA is providing the public with another opportunity to comment on the corrective measures described in this document before the remedy decision is finalized. The public is also encouraged to comment on any additional corrective action measures not addressed in the corrective measures study. The public comment period will run from August 13, 2001 to September 27, 2001.

EPA will address comments on an individual basis when possible. A public hearing may be scheduled if sufficient interest is shown, and there is new information which was not considered in the Agency's evaluations.

All comments received from the public will be summarized and addressed by EPA in a response to comments. The response to comments will be drafted after the public comment period has ended and will be incorporated into the Administrative Record.

The Administrative Record, which includes this Statement of Basis, correspondence, and reports relevant to the remedy selection, is available for public review at the following locations:

Haysville Public Library
130 W. Grand Street
Haysville, Kansas 67060

Contact: Norma Johnson
(316) 524- 5242

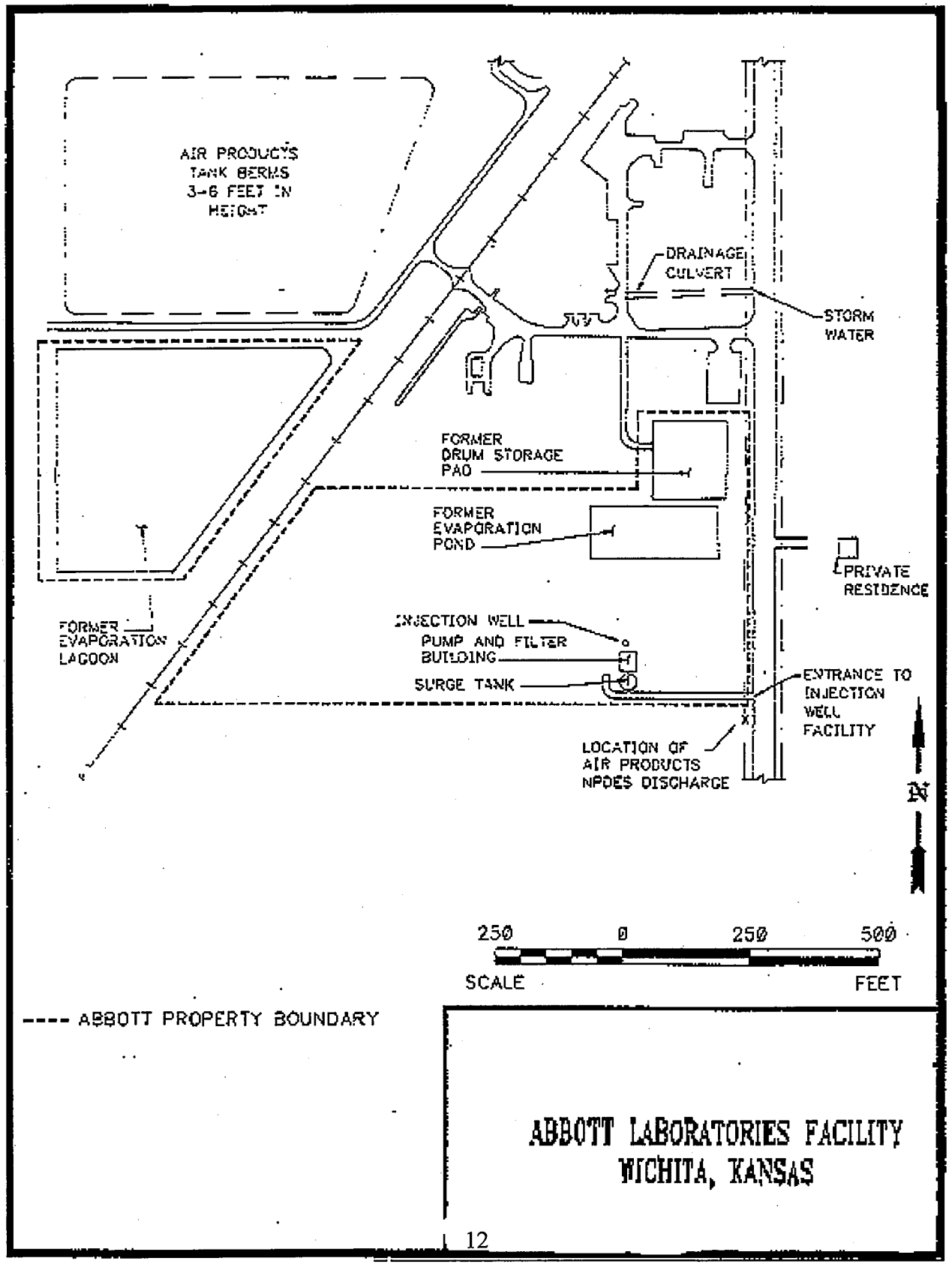
EPA Region 7 Library
901 N. Fifth Street
Kansas City, Kansas 66101

Contact: 1-800-223-0425 or
(913) 551-7241

The public may submit written comments and questions to:

William F. Lowe
ARTD/RCAP
901 N. Fifth Street
Kansas City, Kansas 66101
Phone: (913) 551-7547
Toll-free: 1 (800) 223-0425 or directly at
(913) 551-7547
E-Mail--- lowe.bill@epa.gov---

END OF STATEMENT OF BASIS


AIR PRODUCTS
TANK BERMS
3-6 FEET IN
HEIGHT
DRAINAGE
CULVERT
STORM
WATER
FORMER
DRUM STORAGE
PAD
FORMER
EVAPORATION
POND
PRIVATE
RESIDENCE
INJECTION WELL
PUMP AND FILTER
BUILDING
SURGE TANK
FORMER
EVAPORATION
LAGOON
ENTRANCE TO
INJECTION
WELL
FACILITY
LOCATION OF
AIR PRODUCTS
NPDES DISCHARGE
N
250 0 250 500
SCALE
FEET
---- ABBOTT PROPERTY BOUNDARY
ABBOTT LABORATORIES FACILITY
WICHITA, KANSAS